UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/783,701	02/14/2001	Rong Pan	STFD.009PA	6340

7590 08/03/2004

Crawford PLLC
Suite 390
1270 Northland Drive
St. Paul, MN 55120

EXAMINER	
VOLPER, THOMAS E	

ART UNIT	PAPER NUMBER
2665	3

DATE MAILED: 08/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/783,701	Applicant(s) PAN ET AL.	
	Examiner Thomas Volper	Art Unit 2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-23 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Bechtolsheim et al. (US 6,515,963).

Regarding claims 1, 11 and 12, Bechtolsheim discloses detecting a matching flow identification between a recently-received incoming packet with at least one packet selected from a set of outgoing packets, and mitigating unbalanced bandwidth allocation due to congestion-problem flows by reducing the processing priority of at least one of the selected packet and the recently-received packet (col. 9, line 60 – col. 10, line 37). The dropping of a packet of a non-adapting aggressive flow (NAF) meets the limitation of reducing the processing priority of that packet. Bechtolsheim also discloses using a probabilistic function corresponding to a particular flow in selecting a packet to drop (col. 12, lines 4-14).

Regarding claim 2, Bechtolsheim discloses incrementing a credit field in a flow table for a particular flow each time a packet from that flow is enqueued (col. 10, lines 18-21). Bechtolsheim also discloses that the packets are identified as belonging to a particular flow by a flow label in the packet header (col. 6, lines 32-33).

Regarding claim 3, Bechtolsheim discloses quantifying congestion-problem flows, and assigning a processing priority to the quantified congestion-problem flows as a function of the quantification (col. 10, lines 18-64).

Regarding claim 4, Bechtolsheim discloses that for each NAF exceeding the buffer limit, packets will be dropped (col. 10, lines 18-46).

Regarding claims 5, 9 and 10, Bechtolsheim discloses using a probabilistic drop computation (col. 12, lines 4-14). This computation is a function of a particular flow, as well as a function of where the packet is in the queue. Since the new packets in the queue for a particular flow are the packets that would be dropped if the NAF limit were exceeded (col. 10, lines 25-26), the probabilistic decision to drop a packet is based on the packet closest to the back of the queue for a particular flow.

Regarding claim 6, Bechtolsheim discloses no new packets for a NAF exceeding its limit will be enqueued until *some* are read out (col. 10, lines 38-46). This implies that a plurality of packets all matched to the same flow may exist in the queue.

Regarding claim 7, as stated in the paragraph regarding claims 1, 11 and 12, the dropping of a packet for a particular flow equates to reducing the processing priority for that packet.

Regarding claim 8, as stated above, the newest packet for a NAF is dropped when the NAF reaches its limit.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 13-18 and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bechtolsheim et al. (US 6,515,963) in view of Silberschatz et al. (US 6,556,578).

Regarding claims 13, 20 and 22, Bechtolsheim discloses all of the limitations (see 35 U.S.C. 102(e) rejection of claims 1, 11 and 12 above for specific references) except that the system is implemented on a server including a CPU. Silberschatz discloses a packet dropping algorithm for achieving a balanced bandwidth allocation in a server, wherein a processor (88) is configured by means of software to manage the transfer and dropping of packets (col. 2, lines 38-47; col. 3, lines 53-64; see also Fig. 1B). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to implement the system of Bechtolsheim in a server including a CPU. One of ordinary skill in the art would have been motivated to do this in order to do this because a server manages many different flows of packets and would need some sort of fair method to balance the allocation of resources to all of the flows.

Regarding claim 14, the server of Silberschatz is intended to serve Internet traffic (col. 1, lines 14-36). In addition, Bechtolsheim discloses prioritizing packets relating to a particular flow (col. 13, lines 11-39).

Regarding claims 15-17, Bechtolsheim discloses using a probabilistic drop computation (col. 12, lines 4-14). This computation is a function of a particular flow, as well as a function of where the packet is in the queue. Since the new packets in the queue for a particular flow are the packets that would be dropped if the NAF limit were exceeded (col. 10, lines 25-26), the

probabilistic decision to drop a packet is based on the packet closest to the back of the queue for a particular flow.

Regarding claim 18, Bechtolsheim discloses a dynamic buffer limiting scheme that avoids the per-flow lookup, setup, and tear down overhead of previous queue-based management systems. The dynamic buffer limit is re-determined on each packet reception, thus avoiding maintaining state for each flow (col. 4, lines 55-67).

Regarding claims 21 and 23, Bechtolsheim discloses that for each NAF exceeding the buffer limit, packets will be dropped (col. 10, lines 18-46).

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bechtolsheim et al. (US 6,515,963) in view of Silberschatz et al. (US 6,556,578) as applied to claims 13-18 and 20-23 above, and further in view of Aweya et al. (US 6,690,645).

Regarding claim 19, Bechtolsheim in view of Silberschatz fails to expressly disclose another communicatively-coupled server that is not adapted to detect a matching flow identification between a recently-received incoming packet with at least one packet selected form a set of outgoing packets. Aweya discloses a network element (14) in a network (10) that is capable of probabilistically dropping packets to reduce congestion (see Figure 1). Aweya also discloses that there may be any number of such network elements (14) connected to the network between a source and a sink (col. 4, line 63 – col. 5, line 3). Thus, in a packet network (10) there may be a plurality of elements communicatively-coupled to each other between a source and a sink. Aweya fails to expressly disclose that one of the communicatively-coupled elements does not have the inventive feature of packet dropping. However, in a large packet network, such as

the Internet, it is unreasonable to expect every network element, i.e. router, gateway, server etc., for forwarding packets to a sink, or destination, would have to have this inventive feature in order for the network element (14) with the inventive feature to be able to send packets to that particular sink. In other words, it is obvious for the network element (14) to be communicatively-coupled to an element without the packet dropping feature. At the time the present invention was made, it would have been obvious to a person of ordinary skill in the art to communicatively couple a server in the invention of Bechtolsheim in view of Silberschatz to a server that did not have the feature of dropping packets from NAFs, which includes the feature of matching recently-received packets with a packet selected from a set of outgoing packets. One of ordinary skill in the art would have been motivated to couple the server of Bechtolsheim in view of Silberschatz to a server minus the inventive feature in order to successfully send packets to destinations on the Internet served by existing routing devices.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Cheriton (US 6,724,721) Approximated Per-Flow Rate Limiting

- Muller et al. (US 6,606,301) Method and Apparatus for Early Random Discard of Packets

7. Any inquiry concerning this communication, or earlier communications from the examiner should be directed to Thomas Volper whose telephone number is 703-305-8405 and

fax number is 703-746-9467. The examiner can normally be reached between 8:30am and 6:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached at 703-308-6602. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

Thomas E. Volper

TEV

July 23, 2004

ALPUS H. HSU
PRIMARY EXAMINER